

Application No. 09/872,412
Amendment Dated: July 19, 2005
Reply to Office Action of April 19, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Original) In a communication network system having at least a first switch and a second switch communicatively coupled together by a plurality of links, the first switch having at least a plurality of first ports, and the second switch having at least a plurality of second ports, each of the links communicatively coupling one of the first ports to a corresponding one of the second ports, a method of routing frames received at the first switch to the second switch, the method comprising:

selecting a new port from the first and second ports;

adding the new port to a trunked group in response to determining whether the new port qualifies as a trunking port;

selecting a pair of trunking ports to be trunking master ports; and
responsive to the first switch receiving frames, the trunking master ports selectively controlling the frames routed over the trunked group to the second switch.

2. (Original) The method according to Claim 1, wherein the first ports and the second ports comprise E-Ports.

3. (Original) The method according to Claim 1, wherein selecting a new port from the first and second ports comprises:

sending a request to exchange link parameters associated with the new port;
receiving a response for the request, the response including a first identifier;
determining whether a second identifier exists, the second identifier having a higher value than the first identifier; and

determining whether the link parameters exchanged successfully.

4. (Original) The method according to Claim 3, wherein the first identifier and the second identifier each comprises a World Wide Name.

5. (Original) The method according to Claim 1, wherein determining whether the new port qualifies as a trunking port comprises:

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determining a one way skew value for the links associated with the trunked group; and

determining whether the new port can be added to the trunked group based on the one way skew value determined.

6. (Original) The method according to Claim 5, wherein adding the new port to a trunked group comprises:

determining whether the new port is configured as a trunked port;

determining whether a link associated with the new port communicates frames at a speed substantially similar to other links in the trunked group;

verifying that the new port resides on one of the first and second switches; and determining that the one way skew value is within a predetermined range.

7. (Original) The method according to Claim 5, wherein determining a one way skew value comprises:

measuring a difference in propagation delay between the links associated with the trunked group.

8. (Cancelled)

9. (Cancelled)

10. (Original) The method according to Claim 1, wherein selecting a pair of trunking ports to be banking master ports comprises:

determining that the new port does not belong to an existing trunked group; and designating the new port as a trunking master port.

11. (Original) The method according to Claim 1, wherein the trunking master ports selectively controlling the frames routed over the trunked group to the second switch comprises:

associating one of a plurality of lists with each of the first ports; and

binding one of the lists associated with a trunking master port to a corresponding one of the links in the trunked group for a time period, the time period enabling a frame to be

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transmitted from the first switch to the second switch, and received at the second switch with "in order" delivery.

12. (Original) The method according to Claim 1, wherein one of the pair of trunking master ports comprises a transmit port routing the frames over the trunked group.

13. (Previously Presented) The method according to Claim 12, wherein the other of the pair of trunking master ports comprises a receive port queuing frames received over the trunked group.

14. (Previously Presented) The method according to Claim 1, wherein the new port is added to the trunked group prior to performing a Link Reset Protocol during a fabric initialization process.

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Original) The computer-implemented method according to Claim 18, wherein the traffic load comprises a plurality of frames.

20. (Original) A communication network system, comprising:
at least a first switch and a second switch communicatively coupled together by a plurality of links;

a group including selected ones of the links;

a plurality of at least first and second ports, the first ports being coupled to the first switch and the second ports being coupled to second switch, each of the selected ones of the links having a pair of ends coupled to corresponding ones of the first ports and the second ports; and

a pair of transmit and receive ports selected respectively from one of the first ports and from one of the second ports, the transmit port routing frames received at the first switch across the group to the second switch.

21. (Original) The system according to Claim 20, further comprising:

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first queuing logic coupled to the transmit port, the first queuing logic enabling frames received at the first ports to be routed through the transmit port and across the group so that the selected ones of the links transmit the frames in an evenly-distributed manner.

22. (Original) The system according to Claim 21, further comprising:
second queuing logic coupled to the receive port, the second queuing logic enabling frames routed across the group to be received at the second switch according to an order of arrival.

23. (Original) The system according to Claim 22, further comprising:
a timer binding a particular list associated with the transmit port to a particular link in the group for a period of time to ensure "in-order" delivery of frames transmitted across the group.

24. (Original) The system according to Claim 23, wherein the timer comprises:

a programmable timeout constant register.

25. (Original) The system according to Claim 23, wherein the first ports and the second ports comprise E-Ports.

26. (Original) The system according to Claim 23, wherein the links comprise ISLs.

27. (Original) The system according to Claim 23, further comprising a one way link timer.

28. (Original) The system according to Claim 23, further comprising:
a Fibre Channel fabric, the first switch and the second switch forming a part of the fabric.

29. (Cancelled)

30. (Cancelled)

31. (Previously Presented) In a communication network system having at least a first switch and a second switch communicatively coupled together by a plurality of links, the first switch having at least a plurality of first ports, and the second switch

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having at least a plurality of second ports, each of the links communicatively coupling one of the first ports to a corresponding one of the second ports, a method for transmitting frames from the first switch to the second switch, the method comprising:

receiving frames for transmission to the second switch at the first switch in order;
queuing the received frames for transmission from the first switch to the second switch;

evenly distributing the queued frames between the plurality of first ports; and
transmitting the queued frames from the plurality of first ports to the plurality of second ports so that the frames are received at the plurality of second ports in order as received at the first switch.

32. (Previously Presented) The method of claim 31, further comprising:
determining skew values for the plurality of links, and
wherein said transmitting of frames uses the determined skew values to control timing of the transmission of the frames.

33. (Previously Presented) The method of claim 32, wherein the skew values are one way skew values.

34. (Previously Presented) The method of claim 32, wherein the first and second switches are Fibre Channel switches and the plurality of links are Fibre Channel links.

35. (Previously Presented) A system for transmitting frames between two network devices, the system comprising:

a first network device having two ports;
a second network device having two ports; and
two links connecting said two ports of said first network device to said two ports of said second network device, and

wherein said first network device includes:
queueing logic for queuing frames to be transmitted to said second network device;
distribution logic for evenly distributing the queued frames between said two ports; and

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transmitting logic for transmitting the queued frames from said two ports over said two links so that the frames are received at said two ports of said second network device in order.

36. (Previously Presented) The system of claim 35, wherein said first and second network devices include:

cooperating logic to determine the skew value between said two links, and wherein said transmitting logic uses said skew value to control timing of the transmission of the frames.

37. (Previously Presented) The system of claim 36, wherein the skew value is a one way skew value.

38. (Previously Presented) The system of claim 36, wherein said first and second network devices are Fibre Channel devices and wherein said two links are Fibre Channel links.

39. (Previously Presented) A first network device for connection to a second network device, the second network device having two ports, with two links connected to the two ports of the second network device, the first network device comprising:

two ports for connection to the two links;
queuing logic for queuing the frames to be transmitted to said second network device;

distribution logic for evenly distributing the queued frames between said two ports; and

transmitting logic for transmitting the queued frames from said two ports over said two links so that the frames are received at said two ports of said second network device in order.

40. (Previously Presented) The first network device of claim 39, further comprising:

skew logic to cooperate with the second network device to determine the skew value between the two links, and

wherein said transmitting logic uses said skew value to control timing of the transmission of the frames.

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41. (Previously Presented) The first network device of claim 39, wherein the first network device is a Fibre Channel device.

42. (Previously Presented) A system for transmitting frames between two network devices, the system comprising:

a host computer;

a storage unit;

a first network device having two ports and coupled to said host computer;

a second network device having two ports and coupled to said storage unit; and

two links connecting said two ports of said first network device to said two ports of said second network device, and

wherein said first network device includes:

queueing logic for queuing frames to be transmitted to said second network device;

distribution logic for evenly distributing the queued frames between said two ports; and

transmitting logic for transmitting the queued frames from said two ports over said two links so that the frames are received at said two ports of said second network device in order.

43. (Previously Presented) The system of claim 35, wherein said first and second network devices include:

cooperating logic to determine the skew value between said two links, and

wherein said transmitting logic uses said skew value to control timing of the transmission of the frames.

44. (Previously Presented) The system of claim 36, wherein the skew value is a one way skew value.

45. (Previously Presented) The system of claim 36, wherein said first and second network devices are Fibre Channel devices and wherein said two links are Fibre Channel links.